

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images,
please do not report the images to the
Image Problem Mailbox.**

THIS PAGE BLANK (USPTO)

(12) UK Patent Application (19) GB (11) 2 316 893 (13) A

(43) Date of A Publication 11.03.1998

(21) Application No 9718946.8

(22) Date of Filing 05.09.1997

(30) Priority Data

(31) 9618772
60026291

(32) 09.09.1996
09.09.1996

(33) GB
US

(71) Applicant(s)

Sprintvest Corporation N.V.

(Incorporated in the Netherlands Antilles)

P.O.Box 6085, International Trade Center,
Piscadera Bay, Curacao, Netherlands Antilles

(72) Inventor(s)

Colin J Kirk
Martin Williamson

(74) Agent and/or Address for Service

Langner Parry
High Holborn House, 52-54 High Holborn, LONDON,
WC1V 6RR, United Kingdom

(51) INT CL⁶

B05B 7/30, B08B 3/02, B60S 3/04

(52) UK CL (Edition P)

B2F FD F135 F208 F305 F316 F330 F345 F350
U1S S1240

(56) Documents Cited

GB 1445190 A US 5445226 A US 4805700 A
US 4277030 A

(58) Field of Search

UK CL (Edition O) B2F
INT CL⁶ B05B 7/00 7/04 7/24 7/26 7/28 7/30, B08B
3/02, B60S 3/04
Online databases: WPI and CLAIMS

(54) Cleaning lance

(57) A cleaning lance is provided in which water from an inlet (1) is directed either to an upper, rinsing barrel (5) or to a lower, foamer barrel (12). The latter is provided with a mixing chamber having an inlet for detergent supplied via a flow control valve (2). A water jet injected into the mixing chamber via a Venturi nozzle (3) draws in and mixes with the detergent and the resulting mixture is ejected by a further Venturi nozzle (4) and draws in air from an exterior air inlet (20) to form a jet of cleaning foam.

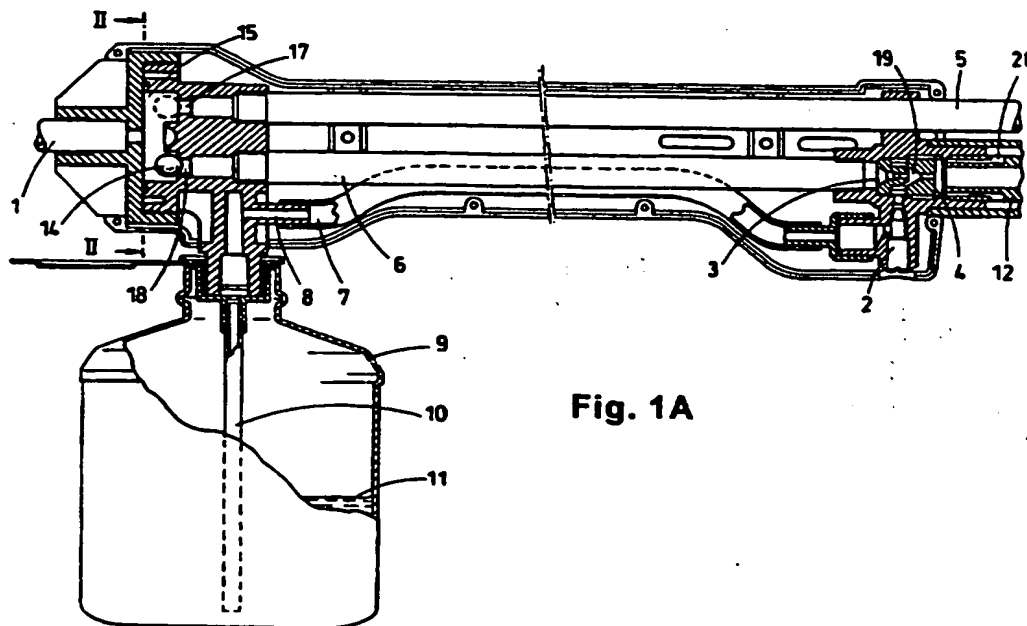
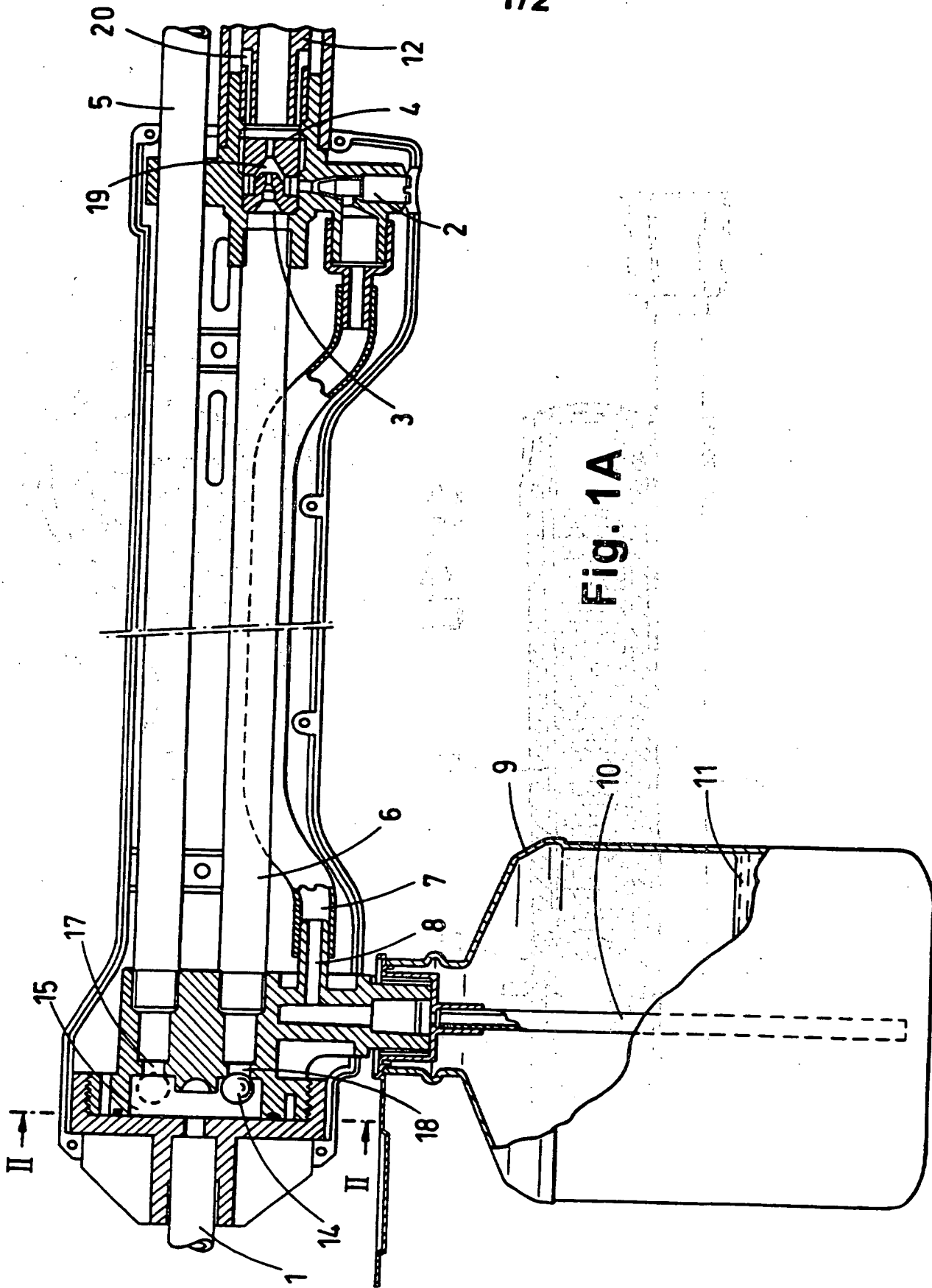


Fig. 1A

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.



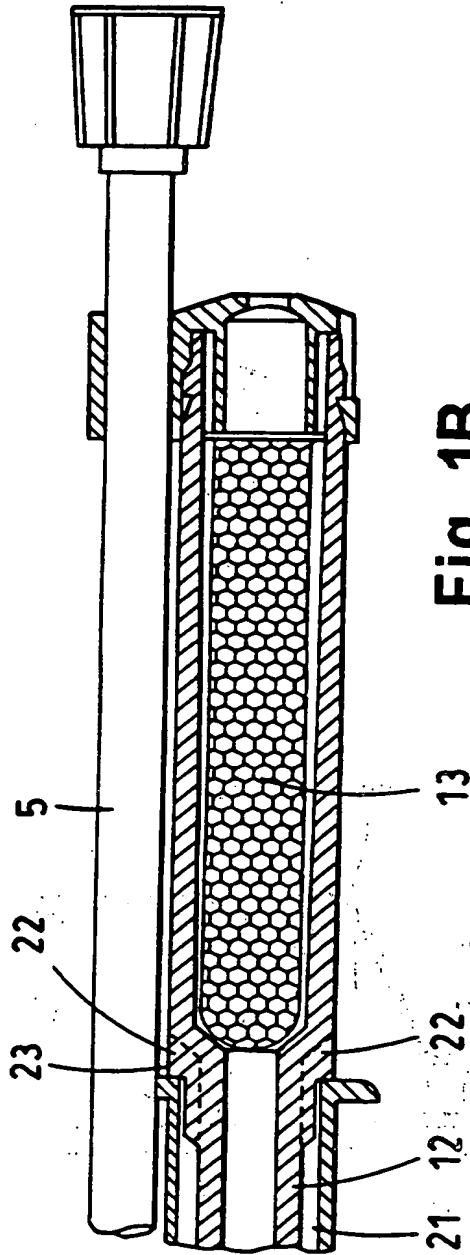


Fig. 1B

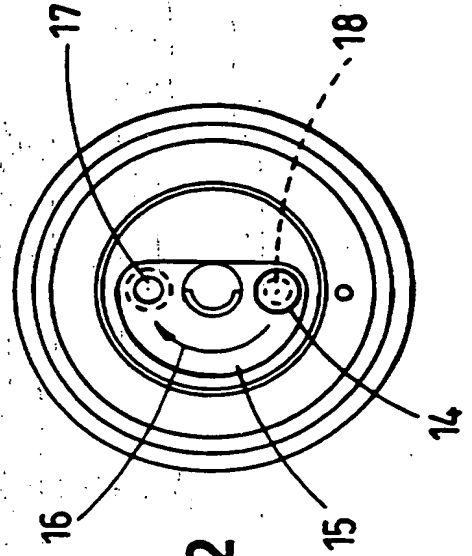


Fig. 2

CLEANING LANCE

The present invention relates to a cleaning lance, of the type used for cleaning the exterior of vehicles for example. Such cleaning lances normally incorporate a barrel having a high pressure nozzle which is used to direct a high pressure water jet at the exterior of the vehicle. Such cleaning lances are normally supplied with pressurised water from a pump driven by an electric motor or a petrol engine and in many cases detergent is fed into the water flow at the site of the pump.

FR-1,363,426 discloses a cleaning lance having a mixing chamber in which an axially directed water jet sucks in air from an air inlet and detergent from a detergent inlet and forms a foam which is ejected axially from the outlet of the chamber. The air inlet and detergent inlet are diametrically opposed within the mixing chamber.

In one aspect the present invention provides a cleaning lance comprising a mixing chamber having an outlet nozzle, the lance having an air inlet outside the mixing chamber adjacent the outlet nozzle, the lance being arranged and used to draw detergent into the mixing chamber by the Venturi action of a water jet injected into the mixing chamber and the resulting mixture being arranged to draw in and mix with air by Venturi action at the air inlet.

Preferably a detergent supply located near the proximal end of the cleaning lance is spaced apart from and communicates with the mixing chamber via a conduit provided with a flow control valve, the mixing chamber being located at the mid portion or distal end of the cleaning lance. It has been found that this construction results in an ergonomic arrangement and reduces the tooling costs associated with the couplings of the detergent supply and the mixing chamber.

Other preferred features of the invention are defined

in the dependent claims.

FR-A-2,519,881 discloses a hand held cleaning lance
5 having two barrels mounted on a common body and valve means
incorporated in the body of the lance and operable by the
user to switch pressurised fluid from an inlet of one barrel
to an inlet of the other barrel, the barrels being arranged
to form jets of different characteristics and the valve
10 means comprising a freely movable valve member which is
retainable by fluid pressure to selectively block said
inlets.

However, in FR-A-2,519,881 the two barrels are located
15 side by side and the movable valve member is movable by
inclining the lance slightly about its longitudinal axis.

Since only one of the barrels is connected to a
detergent bottle, and the barrels are in any case of
20 different lengths and bore sizes, an unbalanced arrangement
results, which is not ergonomic.

A further problem with the above arrangement is that
the valve member easily rolls from one side to the other if
25 pressure is interrupted, so it is possible to accidentally
switch to a detergent stream. This can be dangerous because
detergent is sometimes corrosive.

In accordance with another aspect of the present
30 invention, a cleaning lance comprises first and second
barrels located one above the other and arranged to form
cleaning streams of different characteristics, the lance
having a common water inlet, valve means arranged
selectively to couple the water inlet to each of said
35 barrels, a coupling for a detergent container arranged to
hold the container below both barrels.

The above arrangement is more ergonomic than that of FR
'881 and particularly in a preferred embodiment in which a

first barrel is arranged to form a rinsing stream and a second barrel is arranged to form a stream of foam from a mixture of air, water and detergent and the valve means has a default position in which it selectively couples the first barrel to the water inlet, the valve means being operable by the user on reducing the water pressure at the water inlet, the arrangement prevents accidental generation of a foam stream.

In a preferred embodiment, the valve means comprises an elongate arcuate (preferably semi-circular) chamber having an inlet and having respective spaced apart outlets communicating with the barrels, a rolling or sliding valve member (such as a steel ball for example) being located in the chamber and being arranged to move within the chamber to block one of the outlets on tilting the lance and to block the other of the outlets automatically (eg. by the action of gravity) when the pressure is interrupted. To this end, the lance is preferably provided with trigger means for blocking fluid pressure to enable such movement of the valve member and for reapplying fluid pressure to maintain the valve member in position against the last-blocked outlet by fluid pressure irrespective of the angle of tilt of the lance.

However, other valve means can be employed. Preferably, however, the valve means is latched by fluid pressure which allows for rapid change in comparison with a non-latching, manually operated arrangement which involves a significant delay and dividing of the flow.

Further preferred features are defined in the dependent claims.

A preferred embodiment of the invention is described below by way of example only with reference to Figures 1 and 2 of the accompanying drawings wherein:

FIG. 1A is a longitudinal cross-section showing the

proximal end and mid-portion of a cleaning lance in accordance with the invention;

5 FIG. 1B shows the distal portion of the cleaning lance of Fig. 1A, and

 FIG. 2 is a section taken on II-II of Figure 1A.

10 Referring to Figure 1A, an elongate cleaning lance is shown to comprise a water inlet 1 provided with a trigger attachment (not shown) for applying and releasing water under pressure. The water inlet 1 communicates with a valve comprising a steel ball 14 which runs within a semi-circular ball valve chamber 15 as best seen in Figure 2. The ball 14
15 has a lower default position in which it blocks an inlet 18 to the foamer barrel 12 and has an upper position at which it blocks an inlet 17 to a pressure stream barrel 5 which generates a water jet. As shown in Figure 2, the path of the steel ball 14 between these two extreme positions is
20 semi-circular and accordingly it can be moved between these two positions by tilting the lance about its longitudinal axis after releasing the pressure with the trigger attachment connected to water inlet 1.

25 In accordance with one aspect of the invention, a water jet is formed within a mixing chamber 19 by a Venturi nozzle 3 which is supplied with high pressure water by conduit 6 from inlet 18. The resulting jet draws in detergent 11 via a feed tube 10, mounting 8, detergent conduit 7 and needle valve 2 which controls the flow of detergent into the mixing
30 chamber 19. The resulting mixture of water and detergent exits the mixing chamber via a further Venturi nozzle 4 which draws in air by Venturi action through an annular air inlet 20 which communicates with an annular passage 21 (Figure 1B) which in turn has an air inlet open 23 to the
35 atmosphere. The mixture of air, water and detergent passing along the foamer barrel 12 is foamed by a mesh 13 (Figure 1B) and forms a stream of cleaning foam. The mesh is a conventional mesh of plastics material (polypropylen or nylon).

Annular passage 21 extends axially of the lance around barrel 12 and at its end remote from that end coupled with air inlet 20 there is provided one or more axially extending walls circumferentially spaced about the outer peripheral surface of the barrel 12 and defining passages therebetween communicating with the external atmosphere via opening(s) 23 in the external surface of barrel 12 prior to but adjacent to foaming mesh 13 in the direction of movement of the water detergent and air mixture through barrel 12. Therefore when air is required it is drawing through opening 23 into the passages between walls 22 and then into the Venturi 4 via the annular passage 21 and air inlet 20.

A removable detergent cartridge 9 provided with its own detergent feed tube 10 and associated cap is attachable to mounting 8 by a standard bayonet fitting (not shown).

Referring to Figure 2, it will be noted that the ball 14 will normally fall to the lower position at which it blocks inlet 18 by the action of gravity. On releasing the water pressure at inlet 1 and tilting the lance anti-clockwise by 180° about its longitudinal axis, the ball 14 can be moved to block inlet 17 and at this point pressure can be reapplied by the trigger (not shown) to maintain the ball in this position and form a foam jet by flow through inlet 18 to mixing chamber 19. When it is desired to wash off the foam, the water pressure is momentarily released by releasing the trigger, the lance is tilted slightly about its longitudinal axis to enable the ball 14 to roll back to its lower position, and fluid pressure is then reapplied by the trigger, allowing water to flow directly via inlet 17 to the upper barrel to form a cleaning stream.

The cleaning lance of the present invention can be used not only for vehicle cleaning but also for other cleaning applications, such as abattoir sanitising for example.

CLAIMS:

1. A cleaning lance comprising a mixing chamber (19) having an outlet nozzle (4), characterised in the lance having an air inlet (20) outside the mixing chamber adjacent the outlet nozzle, the lance being arranged in use to draw detergent into the mixing chamber by the Venturi action of a water jet injected into the mixing chamber (19) and the resulting mixture being arranged to draw in and mix with air by Venturi action at the air inlet (20).

2. A cleaning lance as claimed in claim 1 wherein a detergent supply (9) located near the proximal end of the cleaning lance is spaced apart from and communicates with the mixing chamber (19) via a conduit (7) provided with a flow control valve (2), the mixing chamber (19) being located at the mid portion or distal end of the cleaning lance.

3. A cleaning lance as claimed in claim 1 or claim 2, wherein the cleaning lance has a first barrel (5) arranged to form a rinsing stream and a second barrel (12) arranged to form a stream of foam from the mixture of air, water and detergent, the first and second barrels being disposed one above the other and above a coupling (8) arranged to receive a detergent container.

4. A cleaning lance as claimed in claim 3, wherein the first and second barrels (5,12) are coupled by latching valve means (15) to a common water inlet (1), the valve means having a default position in which it selectively couples the first barrel to the water inlet and the valve means being operable by the user on reducing water pressure at the water inlet.

5. A cleaning lance as claimed in claim 4, wherein said valve means (15) comprises a rolling or sliding valve member (14) which is movable to selectively block a lower

inlet (18) to the second barrel (12) or an upper inlet (17) to the first barrel (5).

5

6. A cleaning lance as claimed in claim 5, wherein the valve means (15) defines a curved path for the valve member (14) as it moves, in use, between its selective blocking positions.

10

7. A cleaning lance as claimed in claim 5 or claim 6, wherein the valve means (15) is switchable between its selective blocking positions by tilting or rotating the lance.

15

8. A cleaning lance as claimed in any preceding claim, comprising a mesh (13) located in a barrel (24) downstream of the mixture of air, water and detergent and arranged to foam the mixture.

20

9. A cleaning lance characterised in first and second barrels (5,12) located one above the other and arranged to form cleaning streams of different characteristics, the lance having a common water inlet (1), valve means (15) arranged selectively to couple the water inlet to each of said barrels (5,12), and a coupling (8) for a detergent container (9) arranged to hold the container below both barrels.

25

30

10. A cleaning lance substantially as described hereinabove with reference to Figures 1 and 2 of the accompanying drawings.



Application No: GB 9718946.8
Claims searched: 1-8

Examiner: John Warren
Date of search: 24 December 1997

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:
UK Cl (Ed.O): B2F
Int Cl (Ed.6): B05B 7/00, 7/04, 7/24, 7/26, 7/28, 7/30; B08B 3/02; B60S 3/04
Other: ONLINE Databases: WPI and CLAIMS

Documents considered to be relevant:

| Category | Identity of document and relevant passage | Relevant to claims |
|----------|---|--------------------|
| A | GB 1 445 190 KOLLMAI - note two barrels 54, 56 and valve 42 | 3,9 |
| X | US 5 445 226 SCOTT - Column 5 lines 60-66; Column 6 line 67 to Column 7 line 30 | 1,2 |
| X | US 4 277 030 HECHLER - see Column 3 lines 3-11, Column 8 lines 10-13 | 1 |
| X | US 4 805 700 HOOVER - see Column 3 lines 32-49 | 1 |

| | | | |
|---|---|---|--|
| X | Document indicating lack of novelty or inventive step | A | Document indicating technological background and/or state of the art. |
| Y | Document indicating lack of inventive step if combined with one or more other documents of same category. | P | Document published on or after the declared priority date but before the filing date of this invention. |
| & | Member of the same patent family | E | Patent document published on or after, but with priority date earlier than, the filing date of this application. |

THIS PAGE BLANK (USPTO)